FIG. 1

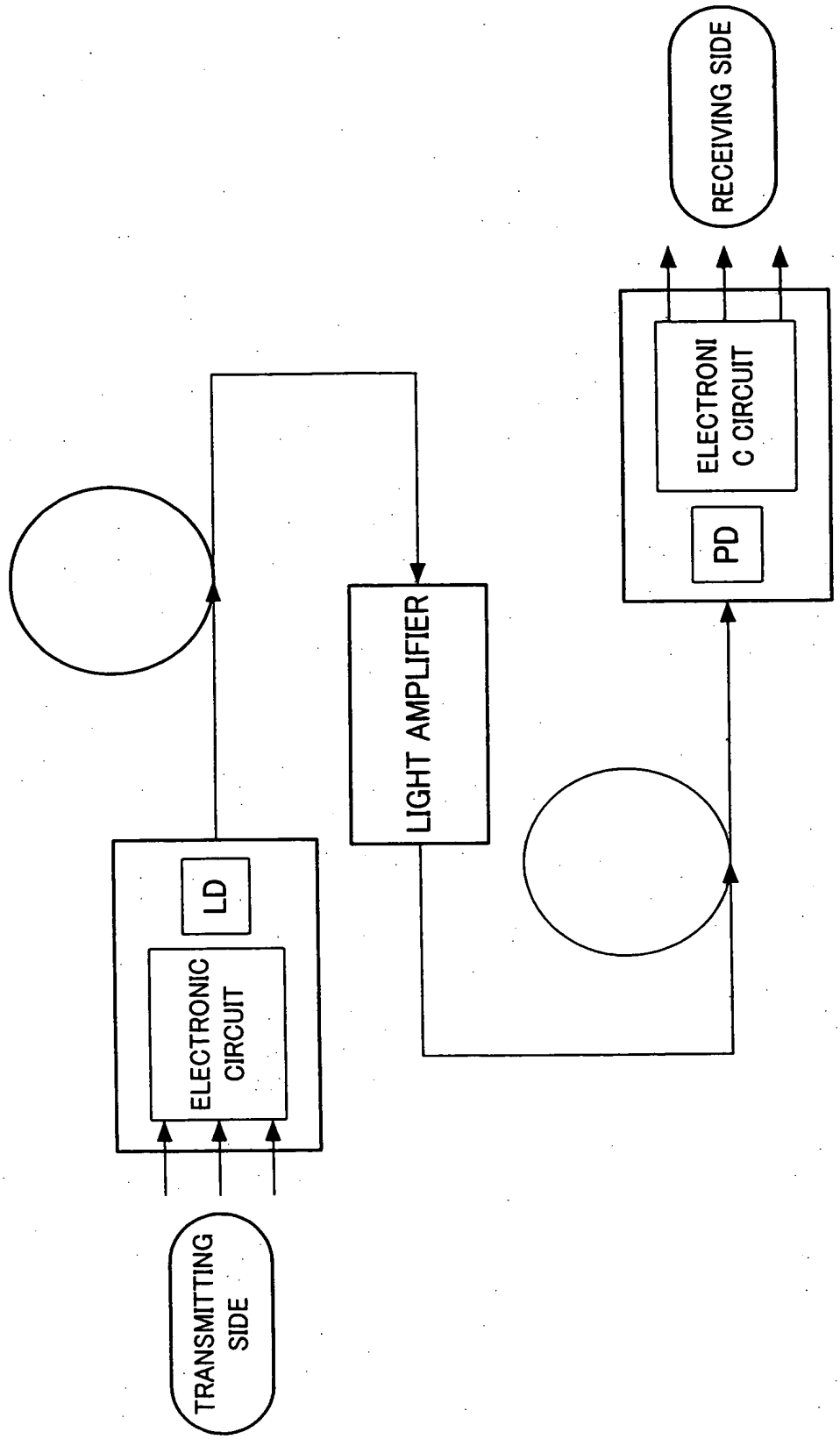
RECEIVING SIDE
ELECTRONI C CIRCUIT
PD
LIGHT AMPLIFIER
LD
ELECTRONIC CIRCUIT
TRANSMITTING SIDE

FIG. 2

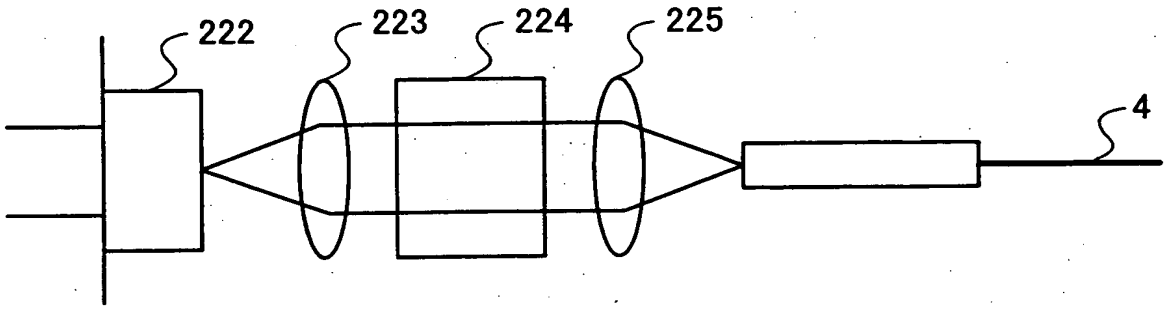

FIG. 3A

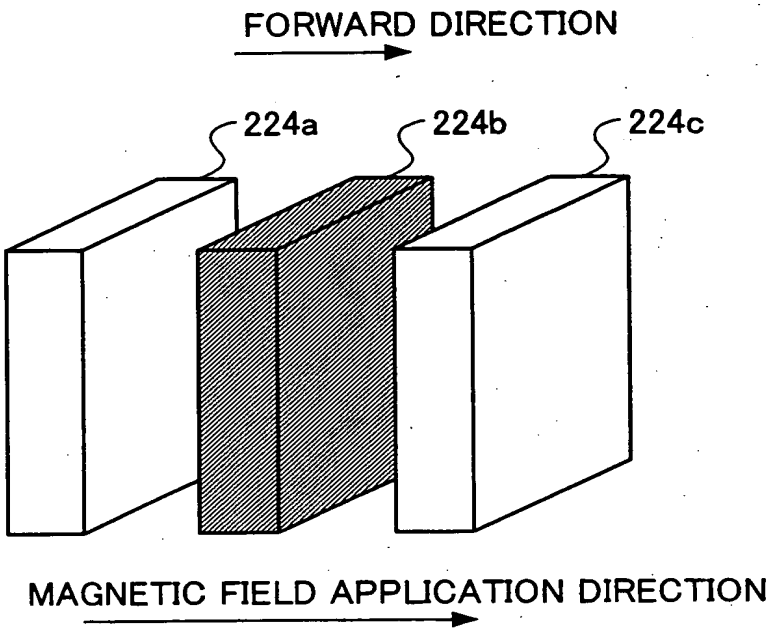
FORWARD DIRECTION
224a
224b
224c
MAGNETIC FIELD APPLICATION DIRECTION

FIG. 3B

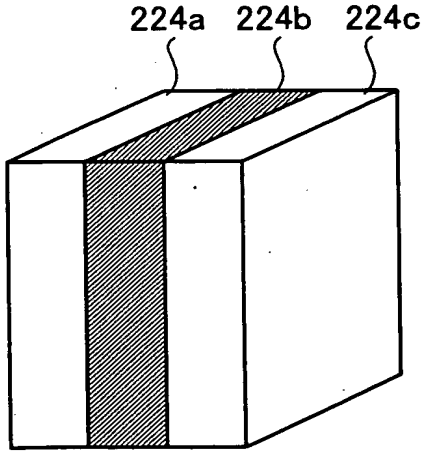
224a
224b
224c

FIG. 4

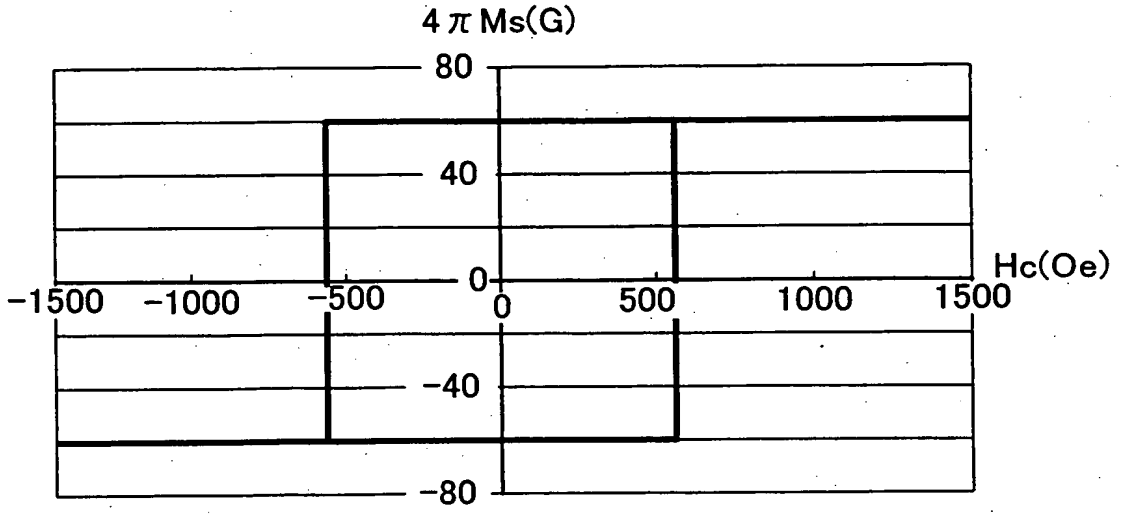
4 π Ms(G)
80
40
0
-40
-80
-1500
-1000
-500
0
500
1000
1500
Hc(Oe)

FIG. 5

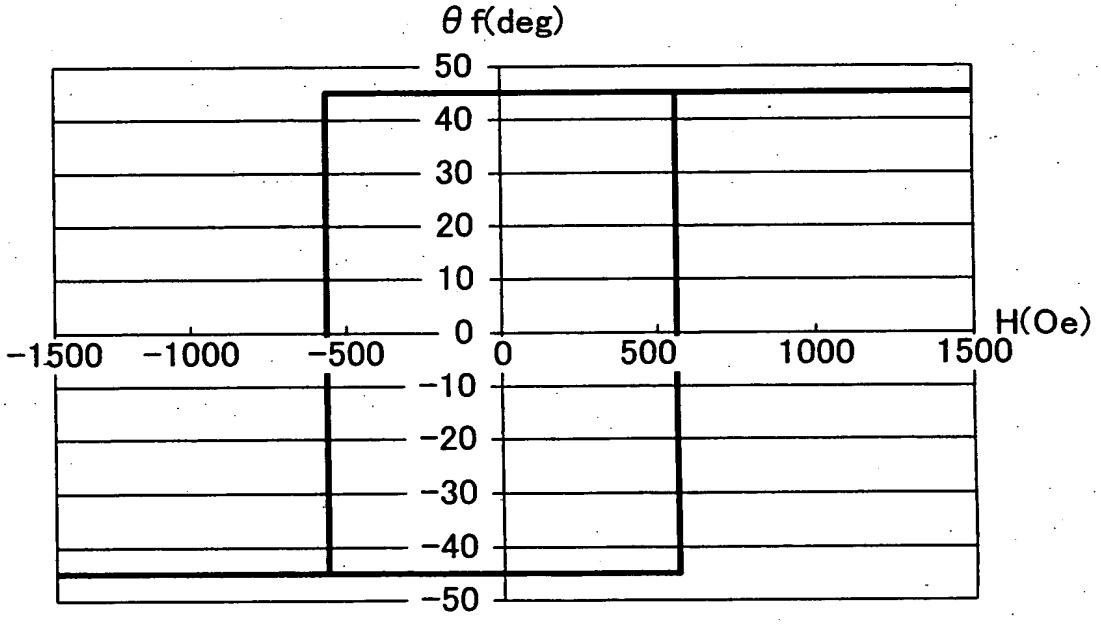
θ f(deg)
50
40
30
20
10
0
-10
-20
-30
-40
-50
-1500
-1000
-500
0
500
1000
1500
H(Oe)

FIG. 6

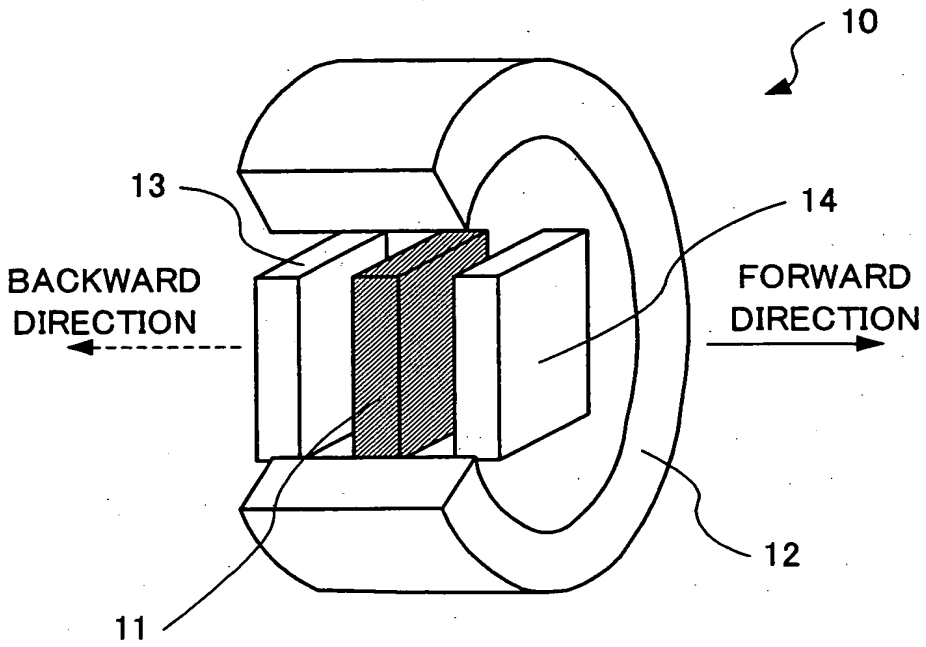

FIG. 7A

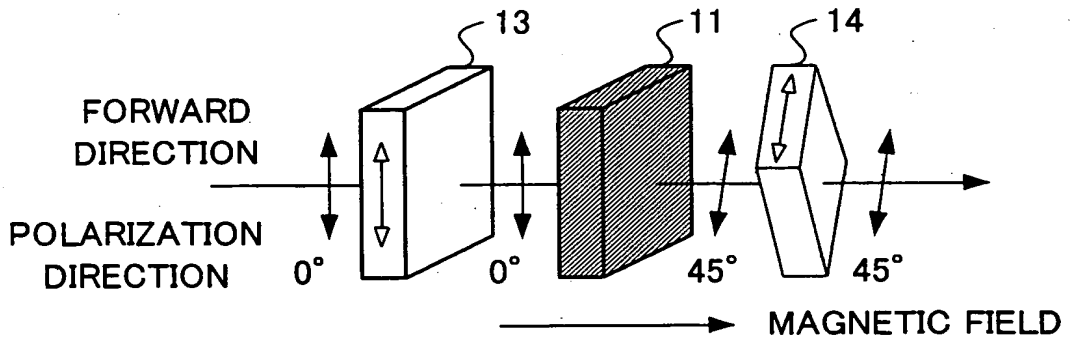
13
11
14
FORWARD DIRECTION
POLARIZATION DIRECTION
0°
0°
45°
45°
MAGNETIC FIELD

FIG. 7B

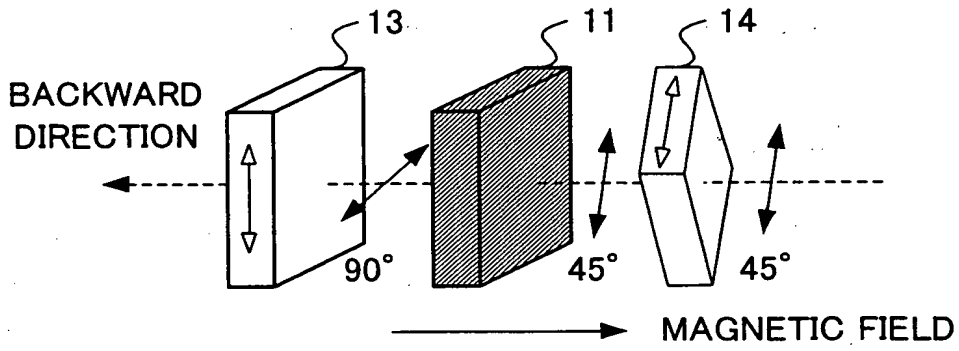
13
11
14
BACKWARD DIRECTION
90°
45°
45°
MAGNETIC FIELD

FIG. 8

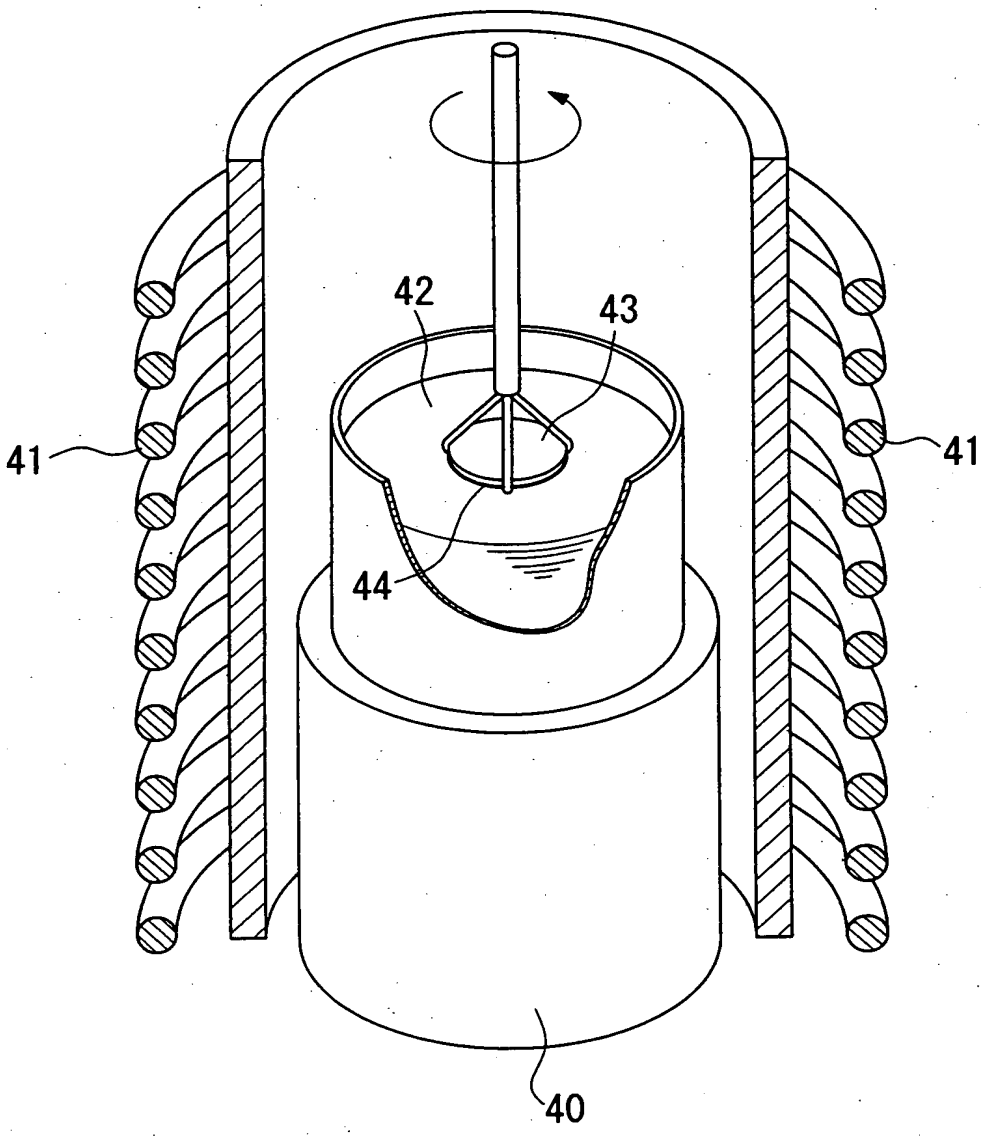

FIG. 9

SAMPLE No.	CHEMICAL COMPOSITION	ROTARY MOMENT (° /cm)	TEMPERATURE PROPERTY (%) (° /°C)	WAVELENGTH PROPERTY (%) (° /nm)	INSERTION LOSS (dB)	MAGNETIC TYPE	REMARKS
1	$Bi_{1.0}Gd_{0.4}Tb_{1.2}Yb_{0.4}Fe_{4.0}Ga_{1.0}O_{12}$	800	10.8 0.078	6.8 0.061	0.07	HARD MAGNETIC	PRESENT INVENTION
2	$Bi_{1.2}Tb_{1.4}Y_{0.4}Fe_{3.8}Ga_{1.2}O_{12}$	950	11.8 0.085	6.8 0.061	0.12	HARD MAGNETIC	COMPARATIVE EXAMPLE (CONTAINING NO Gd)
3	$Bi_{1.2}Gd_{1.2}Yb_{0.6}Fe_{3.9}Ga_{1.1}O_{12}$	950	13.9 0.100	8.3 0.075	0.02	HARD MAGNETIC	COMPARATIVE EXAMPLE (CONTAINING NO Tb)
4	$Bi_{0.7}Gd_{1.1}Tb_{1.2}Fe_{4.2}Ga_{0.8}O_{12}$	650	10.4 0.075	6.8 0.061	0.07	HARD MAGNETIC	COMPARATIVE EXAMPLE (CONTAINING NO Yb)
5	$Bi_{1.2}Gd_{1.8}Fe_{4.0}Ga_{0.5}Al_{0.5}O_{12}$	800	11.8 0.085	8.2 0.074	0.07	HARD MAGNETIC	JAPANESE PATENT LAID-OPEN No. 6-222311
6	$Bi_{1.0}Eu_{2.0}Fe_{4.0}Ga_{0.5}Al_{0.5}O_{12}$	800	13.9 0.100	8.3 0.075	0.04	HARD MAGNETIC	JAPANESE PATENT LAID-OPEN No. 9-185027
7	$Bi_{1.37}Tb_{1.63}Fe_{4.0}Ga_{0.84}Al_{0.15}O_{12}$	1050	10.0 0.072	6.7 0.060	0.11	HARD MAGNETIC	JAPANESE PATENT LAID-OPEN No. 9-328398
8	$Bi_{1.48}Tb_{1.08}Ho_{0.44}Fe_{4.09}Ga_{0.77}Al_{0.14}O_{12}$	1100	15.3 0.110	6.9 0.062	0.09	HARD MAGNETIC	JAPANESE PATENT LAID-OPEN No. 10-31112
9	$Bi_{1.0}Gd_{0.3}Tb_{1.4}Yb_{0.3}Fe_{4.3}Ga_{0.7}O_{12}$	920	9.7 0.072	6.7 0.060	0.07	HARD MAGNETIC	PRESENT INVENTION

FIG. 10

SAMPLE No.	CHEMICAL COMPOSITION	ROTARY MOMENT (° /cm)	TEMPERATURE PROPERTY (%) (° /°C)	WAVELENGTH PROPERTY (%) (° /nm)	INSERTION LOSS (dB)	MAGNETIC TYPE	REMARKS
1	$Bi_1Gd_{0.4}Tb_{1.2}Yb_{0.4}Fe_{4.0}Ga_{1.0}O_{12}$	800	10.8 / 0.078	6.8 / 0.061	0.07	HARD MAGNETIC	PRESENT INVENTION (LARGE AMOUNT OF Tb)
10	$Bi_{1.1}Gd_{0.9}Tb_{0.7}Yb_{0.3}Fe_{4.0}Ga_{1.0}O_{12}$	850	11.4 / 0.082	7.1 / 0.064	0.04	HARD MAGNETIC	PRESENT INVENTION (LARGE AMOUNT OF Gd)
11	$Bi_{1.2}Gd_{0.5}Tb_{0.8}Yb_{0.5}Fe_{4.0}Ga_{1.0}O_{12}$	950	11.8 / 0.085	7 / 0.063	0.06	HARD MAGNETIC	PRESENT INVENTION (LARGE AMOUNT OF Bi)
12	$Bi_{1.1}Gd_{0.6}Tb_{0.9}Yb_{0.4}Fe_{4.9}Ga_{0.1}O_{12}$	—	—	—	—	SOFT MAGNETIC	COMPARATIVE EXAMPLE

FIG. 11

SAMPLE No.	CHEMICAL COMPOSITION	ROTARY MOMENT (° /cm)	TEMPERATURE PROPERTY (%) (° /°C)	WAVELENGTH PROPERTY (%) (° /nm)	INSERTION LOSS (dB)	MAGNETIC TYPE	REMARKS
13	$Bi_{1.0}Gd_{0.4}Tb_{1.2}Yb_{0.4}Fe_{4.0}Ga_{0.7}Al_{0.3}O_{12}$	800	10.8 0.078	6.8 0.061	0.07	HARD MAGNETIC	PRESENT INVENTION
14	$Bi_{1.2}Gd_{0.4}Tb_{1.2}Yb_{0.4}Fe_{4.0}Ga_{0.8}Ge_{0.1}Sc_{0.1}O_{13}$	950	11.1 0.080	6.9 0.062	0.07	HARD MAGNETIC	PRESENT INVENTION
15	$Bi_{1.2}Gd_{0.4}Tb_{0.7}Yb_{0.6}Ca_{0.1}Fe_{4.2}Al_{0.5}In_{0.2}Si_{0.1}O_{14}$	950	11.8 0.085	7.0 0.063	0.06	HARD MAGNETIC	PRESENT INVENTION
16	$Bi_{0.9}Gd_{0.7}Tb_{0.7}Yb_{0.3}Sn_{0.2}Eu_{0.2}Fe_{4.5}Ga_{0.4}Ti_{0.1}O_{12}$	770	12.2 0.088	7.2 0.065	0.10	HARD MAGNETIC	PRESENT INVENTION
17	$Bi_{1.0}Gd_{0.5}Tb_{0.5}Yb_{0.5}Dy_{0.3}Lu_{0.2}Fe_{4.0}Ga_{1.0}O_{12}$	800	11.1 0.080	7.2 0.065	0.09	HARD MAGNETIC	PRESENT INVENTION
18	$Bi_{0.9}Gd_{0.9}Tb_{0.7}Yb_{0.4}Tm_{0.3}Fe_{4.1}Ga_{0.9}O_{12}$	770	11.8 0.085	7.2 0.065	0.095	HARD MAGNETIC	PRESENT INVENTION
19	$Bi_{1.1}Gd_{0.6}Tb_{0.9}Yb_{0.2}Er_{0.2}Fe_{4.3}Ga_{0.7}O_{12}$	850	11.1 0.080	7.1 0.064	0.09	HARD MAGNETIC	PRESENT INVENTION
20	$Bi_{1.0}Gd_{0.4}Tb_{1.1}Yb_{0.3}Ho_{0.2}Fe_{4.2}Ga_{0.8}O_{12}$	800	10.8 0.078	6.9 0.062	0.07	HARD MAGNETIC	PRESENT INVENTION
21	$Bi_{0.9}Gd_{1.1}Tb_{0.8}Yb_{0.2}Y_{0.1}Fe_{4.6}Ga_{0.4}O_{12}$	770	11.1 0.080	7.0 0.063	0.07	HARD MAGNETIC	PRESENT INVENTION

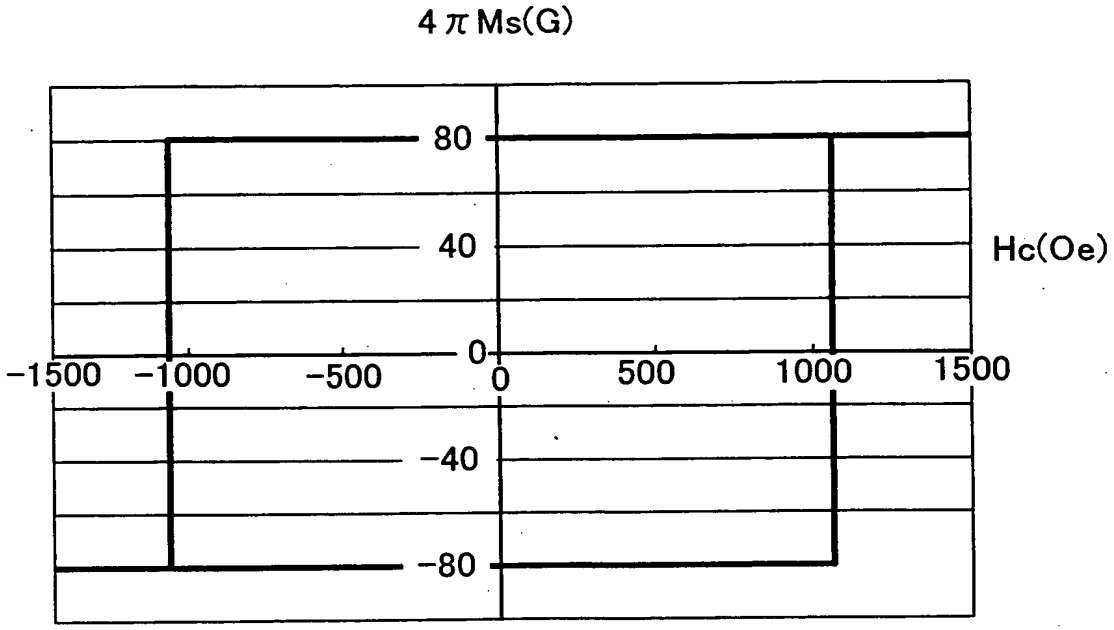

FIG. 12A

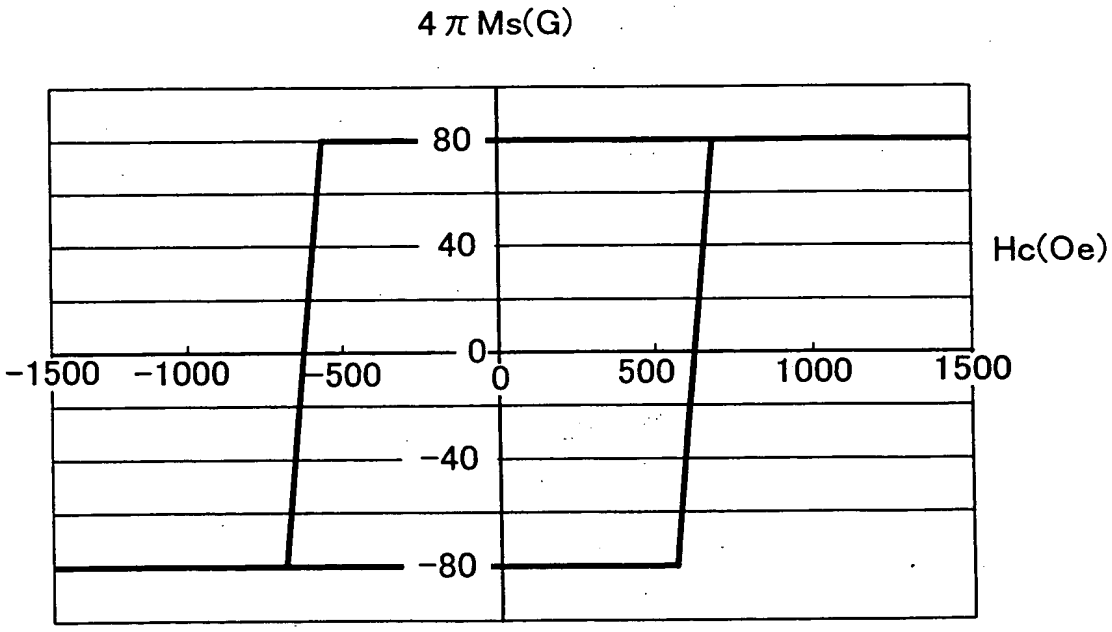

FIG. 12B

FIG. 13

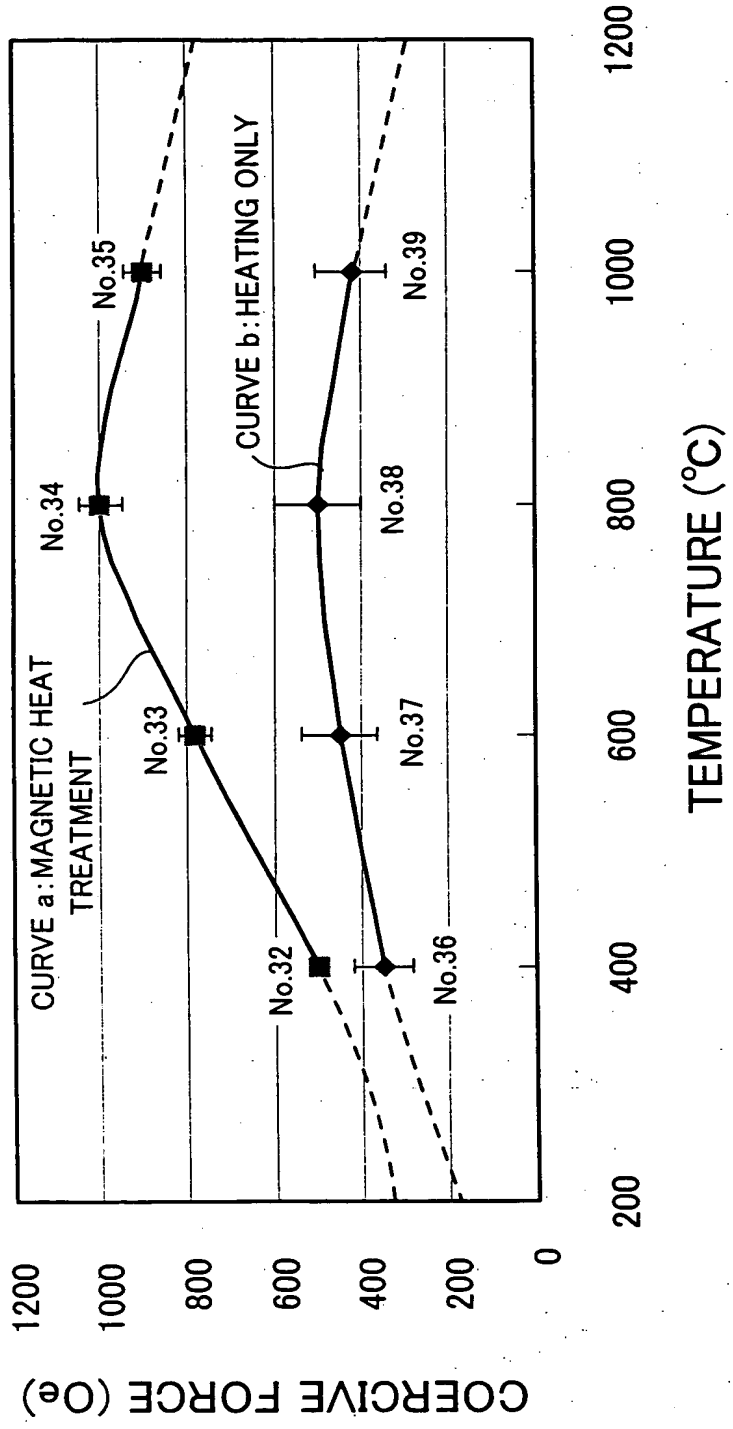
COERCIVE FORCE (Oe)
1200
1000
800
600
400
200
0
TEMPERATURE (°C)
200
400
600
800
1000
1200
CURVE a: MAGNETIC HEAT TREATMENT
CURVE b: HEATING ONLY
No.32
No.33
No.34
No.35
No.36
No.37
No.38
No.39

FIG. 14

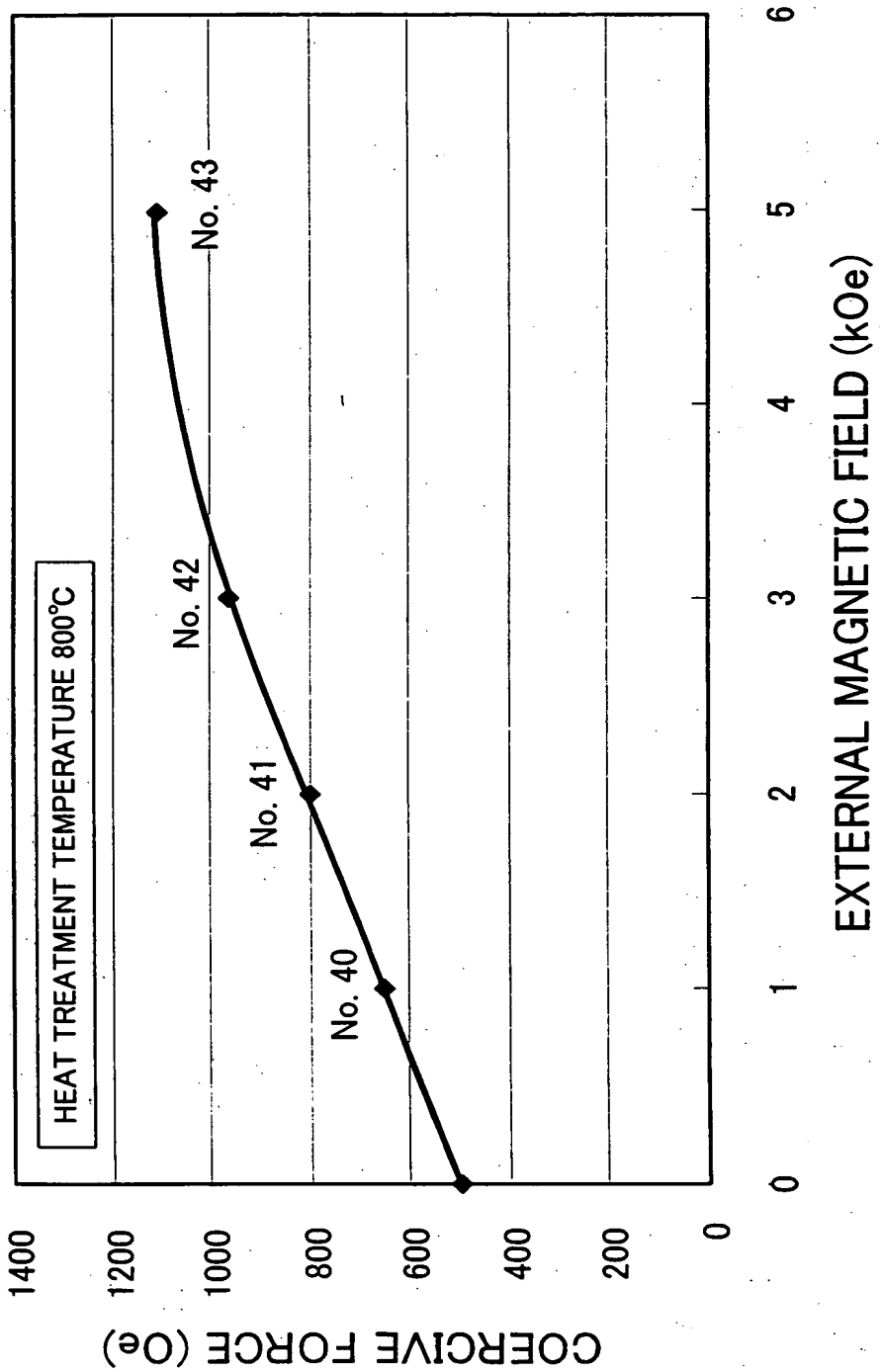
HEAT TREATMENT TEMPERATURE 800°C
No. 43
No. 42
No. 41
No. 40
COERCIVE FORCE (Oe)
1400
1200
1000
800
600
400
200
0
0
1
2
3
4
5
6
EXTERNAL MAGNETIC FIELD (kOe)

FIG. 15A

SECTION OF A SAMPLE CUT BY WIRE SAW

FIG. 15B

SECTION OF A SAMPLE CUT BY DICING MACHINE